



K.S

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/484,961	01/18/2000	Mark C. Nowell	2386.1014001	1330

21005                      7590                      09/22/2003

HAMILTON, BROOK, SMITH & REYNOLDS, P.C.  
530 VIRGINIA ROAD  
P.O. BOX 9133  
CONCORD, MA 01742-9133

EXAMINER

DUONG, FRANK

ART UNIT	PAPER NUMBER
----------	--------------

2666

5

DATE MAILED: 09/22/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/484,961

Applicant(s)

NOWELL ET AL.

Examiner

Frank Duong

Art Unit

2666

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 18 January 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-44 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-44 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

1. This Office Action is a response to the communication dated 01/18/2000. Claims 1-44 are pending in the application.

#### ***Priority***

2. This application is claiming the benefit of a prior filed nonprovisional application under 35 U.S.C. 120, 121, or 365(c). Copendency between the current application and the prior application is required.

#### ***Information Disclosure Statement***

3. The information disclosure statement filed 04/13/2000 complies with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609. It has been considered and placed in the application file.

#### ***Drawings***

4. This application, filed under former 37 CFR 1.60, lacks formal drawings. The informal drawings filed in this application are acceptable for examination purposes. When the application is allowed, applicant will be required to submit new formal drawings. In unusual circumstances, the formal drawings from the abandoned parent application may be transferred by the grant of a petition under 37 CFR 1.182.

***Claim Objections***

5. Claims 38-39 and 43 are objected to because of the following informalities:

Claim 38, line 6, "ro receive" should read --to receive--.

Claim 39, line 1, "the line rate" should read --a line rate--.

Claim 43, line 1, "the converter chip" should read --the converter circuit--.

Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

6. Claims 1-44 are rejected under 35 U.S.C. 102(a) as being anticipated by Hanks et al (*Proposal for a Very Short Reach (VSR) OC-192/STM-64 Interface based on Parallel Optics*, OIF-99.120, pages 1-10, October 1999) (hereinafter "Hanks").

Regarding **claim 1**, in accordance Hanks reference entirety, Hanks discloses a system (Figure 1) for transferring synchronous optical network/synchronous digital hierarchy (SONET/SDH) frames (see page 3, section 1; *Introduction*) between a first and second node (*not shown; inherent; see page 3, section 2; Application*) comprising:  
a demultiplexer (*Mapping Block in the direction toward Transmit*) to map SONET/SDH frames onto a plurality of data channels (see page 3; section 3, last two

Art Unit: 2666

*paragraphs on page 3, Hanks discloses "a converter chip transforms 16 bit parallel bus to 10 parallel channels";*

*an encoder (not shown; inherent in the Transmit Block) to encode and translate data onto each data channel for transmission (see page 4, second paragraph, Hanks discloses "each channel is 8B/10B encoded");*

*a decoder (not shown; inherent in the Receive Block) to decode and translate data on each data channel for reception (see page 4, third paragraph, Hanks discloses "8B/10B decode on each channel"); and*

*a multiplexer (Mapping Block in the direction from Receive) to map the plurality of data channels onto SONET/SDH frames (see page 4, third paragraph, Hanks discloses "The interface will then recombine the 10 channels of data to a 16-bit wide data bus").*

Regarding **claim 2**, in addition to features recited in base claim 1 (see rationales discussed above), Hanks further discloses wherein the multiplexer includes a framer (*not shown; inherent*) to determine the position of frame markers in the data (see page 4, second paragraph, Hanks discloses "SONET framing bytes ... The purpose of the frame delimiters is to aid the de-skewing circuitry at the receiver").

Regarding **claim 3**, in addition to features recited in base claim 1 (see rationales discussed above), Hanks further discloses wherein the first and second node communicate over parallel transmission links (see Figure 1; 12 Fiber Ribbon or seven paragraph on page 4, Hanks discloses "The interfaces shall be optically connected with MPT (MPO) terminates 12 fiber ribbon cables").

Art Unit: 2666

Regarding **claim 4**, in addition to features recited in base claim 2 (see rationales discussed above), Hanks further discloses wherein the parallel transmission links comprise a parallel-optics based transmission link (see *Figure 1; 12 Fiber Ribbon*).

Regarding **claim 5**, in addition to features recited in base claim 3 (see rationales discussed above), Hanks further discloses wherein the parallel transmission link comprise a wavelength division multiplex (WDM) based transmission link (see *Figure 1; 12 Fiber Ribbon and page 3, section 2*).

Regarding **claim 6**, in accordance Hanks reference entirety, Hanks discloses a method (*Figure 1*) for transferring synchronous optical network/synchronous digital hierarchy (SONET/SDH) frames (see *page 3, section 1; Introduction*) between a first and second node (*not shown; inherent; see page 3, section 2; Application*) comprising:

mapping the SONET/SDH frames (*Mapping Block in the direction toward Transmit*) onto a plurality of data channels (see *page 3; section 3, last two paragraphs on page 3, Hanks discloses "a converter chip transforms 16 bit parallel bus to 10 parallel channels"*); and

transferring the SONET/SDH frames over a plurality of parallel transmission links (see *page 3, last paragraph to page 4 second paragraph*).

Regarding **claim 7**, in addition to features recited in base claim 6 (see rationales discussed above), Hanks further discloses wherein transferring the SONET/SDH frames over parallel transmission links includes transmitting and receiving the SONET/SDH frames over parallel transmission links (see *Figure 1 and the description in section 3*).

Art Unit: 2666

Regarding **claim 8**, in addition to features recited in base claim 7 (see rationales discussed above), Hanks further discloses byte stripping of the SONET/SDH frames onto parallel data channels (see *page 3, section 3, last two paragraphs, Hanks discloses "converter chip transforms the 16 bit parallel bus to 10 parallel channels"*).

Regarding **claim 9**, in addition to features recited in base claim 7 (see rationales discussed above), Hanks further discloses encoding each data channel for data formatting (see *page 4, second paragraph, Hanks discloses "each channel is 8B/10B encoded"*).

Regarding **claim 10**, in addition to features recited in base claim 7 (see rationales discussed above), Hanks further discloses framing each data channel (see *page 4, second paragraph, Hanks discloses "some SONET framing bytes on each channel are overwritten with a frame delimiter"*).

Regarding **claims 11-12**, in addition to features recited in base claim 6 (see rationales discussed above), Hanks further discloses wherein the parallel transmission link comprises a 12 fiber (see *Figure 1; 12 Fiber Ribbon or seven paragraph on page 4, Hanks discloses "The interfaces shall be optically connected with MPT (MPO) terminates 12 fiber ribbon cables"*).

Regarding **claim 13**, in addition to features recited in base claim 6 (see rationales discussed above), Hanks further discloses wherein the parallel transmission link comprises a wavelength division multiplex (WDM) based transmission link (see *Figure 1; 12 Fiber Ribbon and page 3, section 2*).

Art Unit: 2666

Regarding **claim 14**, in addition to features recited in base claim 6 (see rationales discussed above), Hanks further discloses wherein the rate of SONET/SDH frames corresponds to an OC-192/STM-64 line rate (see *page 1, Abstract, first line*).

Regarding **claim 15**, in addition to features recited in base claim 7 (see rationales discussed above), Hanks further discloses wherein receiving SONET/SDH frames further comprises, receiving data from each of the parallel transmission links (see *page 4, third paragraph, "In the receive direction, the interface receives 12 parallel optic signals on a fiber ribbon"*); decoding each data channel (see *page 4, third paragraph, "8B/10B decode on each channel"*); realigning each data channel to compensate for an inter-channel skew (see *page 4, third paragraph, "It will de-skew the individual channels"*); and recombining the data channels into a SONET/SDH frame (see *page 4, third paragraph, "The interface will then recombine the 10 channels of data of 16-bit wide"*).

Regarding **claim 16**, in accordance Hanks reference entirety, Hanks discloses a method (*Figure 1*) for transferring synchronous optical network (SONET)/synchronous digital hierarchy (SDH) frames (see *page 3, section 1; Introduction*) over a parallel transmission system (*12 Fiber Ribbon*) comprising:

mapping SONET/SDH frames (*Mapping Block in the direction toward Transmit*) onto data channels (see *page 3; section 3, last two paragraphs on page 3, Hanks discloses "a converter chip transforms 16 bit parallel bus to 10 parallel channels"*); and

transmitting the SONET/SDH frames over a plurality of parallel transmission links (see *page 3, last paragraph to page 4 second paragraph*).



Regarding **claim 17**, in accordance Hanks reference entirety, Hanks discloses a method (*Figure 1*) of transmitting SONET/SDH frames (see page 3, section 1; *Introduction*) having framer markers (*frame delimiters*), the method comprising:

- determining the position of the frame markers (see page 4, second paragraph);
- byte stripping of the SONET/SDH frames (*Mapping Block in the direction toward Transmit*) onto a plurality of parallel of data channels (see page 3; section 3, last two paragraphs on page 3, Hanks discloses "a converter chip transforms 16 bit parallel bus to 10 parallel channels" and page 5, section 3.2; *OC-192 Mapping to Data Channels*);
- encoding each data channel (see page 4, second paragraph, Hanks discloses "each channel is 8B/10B encoded"); and
- transmitting the channels over parallel transmission links (see page 3, last paragraph to page 4 second paragraph).

Regarding **claims 18-19**, in addition to features recited in base claim 17 (see rationales discussed above), Hanks further discloses wherein the parallel transmission link comprises a 12 fiber (see *Figure 1; 12 Fiber Ribbon* or seven paragraph on page 4, Hanks discloses "The interfaces shall be optically connected with MPT (MPO) terminates 12 fiber ribbon cables").

Regarding **claim 20**, in addition to features recited in base claim 17 (see rationales discussed above), Hanks further discloses wherein the parallel transmission links comprises a wavelength division multiplex (WDM) based transmission link (see *Figure 1; 12 Fiber Ribbon* and page 3, section 2).

Art Unit: 2666

Regarding **claim 21**, in addition to features recited in base claim 17 (see rationales discussed above), Hanks further discloses wherein the rate of SONET/SDH frames corresponds to an OC-192/STM-64 line rate (*see page 1, Abstract, first line*).

Regarding **claim 22**, in addition to features recited in base claim 17 (see rationales discussed above), Hanks further discloses wherein frame delimiting is performed by overwriting at least a SONET byte on each data channel (*see page 4, second paragraph, "some SONET framing bytes on each data channel are overwritten with a frame delimiter"*).

Regarding **claim 23**, in addition to features recited in base claim 17 (see rationales discussed above), Hanks further discloses wherein at least a first three SONET framing bytes are overwritten on each data channel (*see page 4, second paragraph, "some SONET framing bytes on each data channel are overwritten with a frame delimiter"*).

Regarding **claim 24**, in addition to features recited in base claim 17 (see rationales discussed above), Hanks further discloses wherein unique frame delimiters are used on a subset of the data channels (*see Figure 4 on page 6; Format of Frame Delimiter and page 6, first two paragraphs, "The unique frame delimiters for channels 1-6 and channel 7-12 are needed to allow detection of crossover in the parallel ribbon fiber"*).

Regarding **claim 25**, in addition to features recited in base claim 24 (see rationales discussed above), Hanks further discloses wherein a first, frame delimiter is

Art Unit: 2666

used for a first half of the data channel and a second frame delimiter is used for a second half of the data channels (see *Figure 4 on page 6; Format of Frame Delimiter*).

Regarding **claim 26**, in addition to features recited in base claim 17 (see rationales discussed above), Hanks further discloses wherein each channel is encoded using a block-code (see *page 5, section 3.3; Channel Encoding and Delimiting; "8B10B codewords"*).

Regarding **claim 27**, in addition to features recited in base claim 17 (see rationales discussed above), Hanks further discloses wherein the data channels are logically combined in such a manner to enable recovery of a single data channel and the logically combined channel exists as a separate data channel (see *page 4, third paragraph and thereafter*).

Regarding **claim 28**, in addition to features recited in base claim 17 (see rationales discussed above), Hanks further discloses wherein a further data channel carries cyclic redundancy check (CRC) bits for the plurality of data channels (see *page 4, first paragraph and thereafter*).

Regarding **claim 29**, in accordance Hanks reference entirety, Hanks discloses a method (*Figure 1*) of receiving SONET/SDH frames (see *pages 3-4, section 3; Introduction*) over a parallel transmission system (*12 Fiber Ribbon*) comprising:

recovering data from each transmission link (see *page 4, third paragraph, "shall recover the clock"*);

decoding each data channel (see *page 4, third paragraph, "8B/10B decode on each channel"*);

Art Unit: 2666

realigning each data channel to compensate for an inter-channel skew (see page 4, third paragraph, *"de-skew the individual channels, by using the frame delimiters, to compensate for any inter-channel skew"*); and

recombining the data channels into a SONET/SDH frame (see page 4, third paragraph, *"recombine the 10 channels of data to a 16-bit wide data bus"*).

Regarding **claims 30-31**, in addition to features recited in base claim 29 (see rationales discussed above), Hanks further discloses wherein the parallel transmission link comprises a 12 fiber (see Figure 1; 12 Fiber Ribbon or seven paragraph on page 4, Hanks discloses *"The interfaces shall be optically connected with MPT (MPO) terminates 12 fiber ribbon cables"*).

Regarding **claim 32**, in addition to features recited in base claim 29 (see rationales discussed above), Hanks further discloses wherein the parallel transmission links comprises a wavelength division multiplex (WDM) based transmission link (see Figure 1; 12 Fiber Ribbon and page 3, section 2).

Regarding **claim 33**, in addition to features recited in base claim 29 (see rationales discussed above), Hanks further discloses wherein the rate of SONET/SDH frames corresponds to an OC-192/STM-64 line rate (see page 1, Abstract, first line).

Regarding **claim 34**, in addition to features recited in base claim 29 (see rationales discussed above), Hanks further discloses wherein the receiver detects a polarity of the transmission links by use of unique frame delimiters on subset of the data channels (see pages 5-6, section 3.3, *Channel Encoding and Delimiting*).

Regarding **claim 35**, in addition to features recited in base claim 30 (see rationales discussed above), Hanks further discloses a loss of synchronization condition on a channel if a plurality of code word violation occurs (see *page 7, section 3.4, Protection Channel*).

Regarding **claim 36**, in addition to features recited in base claim 29 (see rationales discussed above), Hanks further discloses wherein a channel failure is detected using the loss of synchronization condition (see *page 7, section 3.4, Protection Channel*).

Regarding **claim 37**, in addition to features recited in base claim 29 (see rationales discussed above), Hanks further discloses detecting and correcting errors on the data channels by calculating a cyclic redundancy check (CRC) for a block of data on the data channel; comparing it to a corresponding, separately-transmitted CRC for the block; and recovering the data from a protection channel if the CRC's do not match (see *pages 7-8, section 3.5, Error Correction*).

Regarding **claim 38**, in accordance Hanks reference entirety, Hanks discloses a transceiver module (*Figure 1*) for transferring SONET/SDH frames (see *pages 3-4, section 3; Introduction*) between a first and second node, comprising:

a converter circuit (*Mapping Block*) to adapt incoming signals (OC-192 Framer) for transmission of parallel (see *Figure 1; Mapping Block*);

a parallel transmit optic module (*Transmit Parallel Optics*) to transmit data channels (see *Figure 1; Transmit Block*); and

Art Unit: 2666

a parallel receive optic module (*Receive Parallel Optics*) to receive data channels (see *Figure 1; Receive Block*).

Regarding **claim 39**, in addition to features recited in base claim 38 (see rationales discussed above), Hanks further discloses wherein a rate for transferring SONET/SDH frames corresponds to an OC-192/STM-64 line rate (see *page 1, Abstract, first line*).

Regarding **claim 40**, in addition to features recited in base claim 38 (see rationales discussed above), Hanks further discloses wherein the first and second node communicate over parallel transmission links (*12 Fiber Ribbon*).

Regarding **claim 41**, in addition to features recited in base claim 40 (see rationales discussed above), Hanks further discloses wherein the parallel transmission links (*12 Fiber Ribbon*) comprises a parallel-optics based transmission link (*12 Fiber Ribbon*).

Regarding **claim 42**, in addition to features recited in base claim 40 (see rationales discussed above), Hanks further discloses wherein the parallel transmission links comprises a wavelength division multiplex (WDM) based transmission link (see *Figure 1; 12 Fiber Ribbon and page 3, section 2*).

Regarding **claim 43**, in addition to features recited in base claim 38 (see rationales discussed above), Hanks further discloses wherein the converter circuit interfaces with a frame chip (see *Figure 1; Mapping Block and OC-192 Framer*).

Art Unit: 2666

Regarding **claim 44**, in addition to features recited in base claim 38 (see rationales discussed above), Hanks further discloses wherein the parallel transmit optic module is integral with the parallel receive optic module (see *Figure 1*).

### ***Conclusion***

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Lee (USP 5,541,931).

Huscroft et al (USP 5,568,486).

Martin et al (USP 5,841,760).

Donovan et al (USP 6,122,281).

Azizoglu et al (6,430,201).

Fujimoto et al, Skew-Free Parallel Optical Transmission System, IEEE, pages 1822-1831, October 1998.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Frank Duong whose telephone number is (703) 308-5428. The examiner can normally be reached on 7:00AM-3:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Seema Rao can be reached on (703) 308-5463. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Art Unit: 2666

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4700.

A handwritten signature in black ink, appearing to read 'Frank Duong', with a stylized, flowing script.

Frank Duong  
September 15, 2003